

APPENDIX G

DATA VALIDATION MEMORANDA

MEMORANDUM

DATE: December 16, 2003

Anchorage

TO: James Keithly, Anchor Environmental, LLC

FROM: Roger McGinnis, Ph.D., Hart Crowser

Boston

RE: **Data Quality Review AXYS Laboratory Data Package 9952**
Upriver Dam Groundwater Investigation
7870-02

CC: Will Abercrombie, Hart Crowser

Denver

CHEMICAL DATA QUALITY REVIEW

Eight water samples including three blind field duplicate samples and two ambient blank (trip blank) samples collected from three wells located at Upriver Dam between May 15 and June 12, 2003, were shipped to AXYS Analytical Services of Sidney, British Columbia, for analysis. The samples were analyzed in two batches (L5819 and L5850) for polychlorinated biphenyl (PCB) congeners using EPA Method 1668A. The laboratory reported results as Data Package 9952.

Edmonds

Jersey City

Hart Crowser performed a data validation to assess whether analytical results met data quality objectives. Data review followed the format outlined in the EPA Region 10 SOP for validation of Method 1668 Toxic, Dioxin-Like, PCB Data (EPA 1995) modified to include specific criteria of the analytical method. The following criteria were evaluated in the data quality review process:

Long Beach

- Overall data quality;
- Sample handling, holding times, and chain of custody;
- Analytical methodology;
- Instrument performance;

Portland



- Initial calibration;
- Calibration verification and ongoing precision and recovery (OPR) standard results;
- System performance and analytical sensitivity (reporting limits);
- Laboratory and field blanks;
- Cleanup standard recovery;
- Labeled surrogate compound recovery;
- Compound identification criteria; and
- Field replicate samples.

Overall Data Quality

The data for this project are acceptable for use as qualified. The completeness for the associated data is 99.8 percent. Detailed discussions are presented below.

Sample Handling, Holding Times, and Chain of Custody

Sample documentation was complete. The laboratory noted several minor discrepancies between sample labels and the chain of custody forms regarding sample identification numbers. Samples were refrigerated upon receipt by the laboratory. The analytical method indicates that samples may be stored up to 1 year if stored in the dark at 0 to 4°C and preserved. Samples were extracted and analyzed within method-specified holding times.

Analytical Methodology

Samples were extracted using continuous liquid-liquid extraction, EPA Method 3520C, and were analyzed for PCB congeners using EPA Method 1668A, high-resolution gas chromatography/mass spectrometry.

Instrument Performance

Instrument mass resolution and peak resolution met method specified criteria of greater than 10,000 atomic mass units (amu) and less than 20 percent valley/peak height,



respectively. Deviation between exact and theoretical mass was less than 5 ppm for all ions. Ion abundance ratios were within specified limits.

Initial Calibration

Internal standard calibration linearity met criteria of less than 20 percent relative standard deviation. Calibration verification (VER) standard recovery met method-specified criteria and ion abundance ratios were within specified limits.

Calibration Verification/Ongoing Precision and Recovery (OPR) Results

OPR analyte retention times and recoveries were within method performance specifications. Ion abundance ratios were within specified limits.

System Performance/Laboratory Sensitivity

The laboratory achieved the estimated minimum levels (EML) specified in Method 1668A. Reported quantitation limits and analytical results were adjusted for any required dilution factors.

Laboratory and Field Blanks

The following analytes with ion ratios meeting quality control criteria or within 10 percent of criteria were detected in the laboratory method blanks.

Analyte	IUPAC Number (multiple numbers indicate coelution)	6/20/03 Lab Blank in pg/L	7/18/03 Lab Blank in pg/L
2-MoCB	1	1.43	2.64
3-MoCB	2	2.97	2.20
4-MoCB	3	3.37	3.93
2,4-DiCB	7		20.4
3,3'-DiCB	11		17.0
2,2',3-TriCB	16	0.976	
2,2',4-TriCB	17	0.825	1.45
2,2',5-TriCB	18 + 30		2.65
2,3,3'-TriCB	20 + 28	2.25	3.14
2,3,4-TriCB	21 + 33	1.16	2.00



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Analyte	IUPAC Number (multiple numbers indicate coelution)	6/20/03 Lab Blank in pg/L	7/18/03 Lab Blank in pg/L
2,3,4'-TriCB	22		1.00
2,3',5-TriCB	26 + 29	0.317	
2,4',5-TriCB	31	1.76	2.72
2,4',6-TriCB	32	0.605	0.83
2,2',3,3'-TeCB	40 + 41 + 71	0.972	
2,2',3,5'-TeCB	44 + 47 + 65	5.35	3.74
2,2',3,6-TeCB	45 + 51	1.45	
2,2',3,6'-TeCB	46	0.332	
2,2',4,5-TeCB	48	0.481	
2,2',4,5'-TeCB	49 + 69	1.15	1.08
2,2',5,5'-TeCB	52	1.78	3.02
2,3,3',6-TeCB	59 + 62 + 75	0.353	
2,3,4,5-TeCB	61 + 70 + 74 + 76	2.45	2.98
2,3',4,4'-TeCB	66	0.945	
2,3',4,5'-TeCB	68	0.712	
3,3',4,4'-TeCB	77		0.657
2,2',3,3',4-PeCB	82	0.226	
2,2',3,3',5-PeCB	83 + 89	0.949	0.910
2,2',3,3',6-PeCB	84	0.710	
2,2',3,4,4'-PeCB	85 + 116 + 117	0.312	
2,2',3,4,5-PeCB	86 + 87 + 97 + 108 + 119 + 125		2.09
2,2',3,4,6-PeCB	88 + 91	0.404	
2,2',3,4',5-PeCB	90 + 101 + 113	1.71	2.46
2,2',3,5,6-PeCB	93 + 95 + 98 + 100 + 102	1.98	1.96
2,3,3',4',5-PeCB	107 + 124	0.321	
2,3,3',4',6-PeCB	110 + 115	1.57	1.93
2,3',4,4',5-PeB	118	1.04	2.36
3,3',4,4',5-PeB	126	0.340	
2,2',3,3',4,4'-HxCB	128 + 166	0.408	
2,2',3,3',4,5-HxCB	129 + 138 + 160 + 163		3.54
2,2',3,3',4,5'-HxCB	130	0.303	
2,2',3,3',4,6'-HxCB	132		1.38
2,2',3,3',5,6'-HxCB	135 + 151 + 154		1.61
2,2',3,3',6,6'-HxCB	136	0.256	0.437



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Analyte	IUPAC Number (multiple numbers indicate coelution)	6/20/03 Lab Blank in pg/L	7/18/03 Lab Blank in pg/L
2,2',3,4,4',6'-HxCB	139 + 140	0.195	
2,2',3,4,5,5'-HxCB	141		1.10
2,2',3,4',5,5'-HxCB	146	0.266	
2,2',3,4',5,6'-HxCB	147 + 149	1.20	
2,2',4,4',5,5'-HxCB	153 + 168	1.14	
2,2',4,4',6,6'-HxCB	155	0.183	
2,3,3',4,4',5-HxCB	156 + 157	0.968	0.494
2,3,3',4,4',6-HxCB	158	0.368	
2,3,3',4',5',6-HxCB	164		0.292
2,2',3,3',4,4'5-HpCB	170	0.435	
2,2',3,3',4,5,6'-HpCB	174		1.73
2,2',3,3',4,6,6'-HpCB	176		0.262
2,2',3,3',5,6,6'-HpCB	179		0.294
2,2',3,4,4',5,5'-HpCB	180 + 193		3.04
2,2',3,4,4',5',6-HpCB	183 + 185		0.866
2,2',3,4',5,5',6-HpCB	187		2.09
2,3,3,4,4',5,5'-HpCB	189	0.530	0.203
2,2',3,3',4,4',5,5'-OcCB	194	0.605	
2,2',3,3',4,5',6,6'-OcCB	201	0.234	
2,2',3,3',4,4',5,5',6,6'-DeCB	209		0.817

Two ambient field blank samples (AN-D14TB-030515 and AN-D16TB-030515) were submitted to the laboratory with the samples from wells D14 and D16. No ambient field blank was submitted with the sample from the City's "Electric" well. The laboratory also prepared a sampling pump tubing rinse blank (AN-D14RB-030513) by passing high-purity water through brand new, cleaned tubing prior to it being used for sample collection from wells D14 and D16. The "Electric" well sample was collected directly from a tap at the wellhead without the use of tubing.

Blank results were applied to samples in the following order:

1. Detected in laboratory method blank (B). Results were applied to all samples;



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2. Detected in tubing rinse blank results (B1). Results were applied to samples collected using pumps with tubing (wells D14 and D16); and
3. Detected in specific ambient field blank result associated with field samples (B2). Ambient blank AN-D14TB results were applied to samples collected from well D14 and results for AN-D16TB were applied to samples collected from well D16.

Sample results were qualified as non-detected (UB) when concentrations were less than five times those reported in one or more of the blanks. In cases where ion ratios for analytes detected in the laboratory method blank did not meet criteria, blank results were applied to samples if ion ratios were within 10 percent of the criteria.

Cleanup Standard Recovery

Recovery of one cleanup recovery standard ($^{13}\text{C}_{12}$ - 2,4,4'-TriCB) was below the method-specified criterion for sample AN-EWGW-030612. Affected results were qualified as estimated (J) and may exhibit a low bias.

Labeled Surrogate Compound Recovery

The labeled surrogate compound recoveries were outside method-specified QC limits for the following samples:

Sample	Surrogate Compound
AN-D66GW-030515	$^{13}\text{C}_{12}$ - 2-MoCB
AN-D64GW-030515	$^{13}\text{C}_{12}$ - 4-MoCB
AN-EWGW-030612	$^{13}\text{C}_{12}$ - 2,2'-DiCB $^{13}\text{C}_{12}$ - 4,4'-DiCB $^{13}\text{C}_{12}$ - 2,2',6-TriCB $^{13}\text{C}_{12}$ - 2,2'6,6'-TeCB $^{13}\text{C}_{12}$ - 2,2'-DiCB



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Detected results for affected congeners in samples AN-D66GW-030515 and AN-EWGW-030612 listed above have been qualified as estimated (J). For sample AN-D64GW-030515, the surrogate was not recovered and affected results are qualified as Not Quantifiable (NQ).

Compound Identification Criteria

The signal to noise ratio for reported analytes was greater than 2.5. Relative retention times of reported analytes compared to labeled standards were within method-specified criteria. Ion signals for each reported compound maximized within \pm 2 scans. Results for samples that did not meet ion abundance relative ratios were qualified UR and were considered to be undetected.

Field Replicate Samples

Blind field duplicate samples were submitted to the laboratory with each sample. Field replicate results are presented below:

Sample No.	Sample Result Total PCBs in pg/L	Replicate Result Total PCBs in pg/L
AN-D14GW-030515	13.8	9.29
AN-D16GW-030515	19.6	69.9
AN-EWGW-030612	13.9	11.9

The apparent difference between sample AN-D16GW-030515 and its replicate is not particularly significant at these low quantitation levels. Sample AN-D16GW-030515 and its replicate were analyzed in different laboratory batches, and therefore, results from two different blanks were used to qualify data. The primary differences were due to the presence of pentachlorobiphenyl congeners in the replicate sample that were qualified as undetected in the original sample.



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Data Qualifiers

The following data qualifiers were applied to results by the laboratory during the validation process. More than one qualifier may be applied to analytical results.

U - The analyte was not detected. The associated value is the estimated detection limit.

J - The analyte was detected and positively identified. The associated value is an estimated concentration because of minor exceedances of quality control criteria.

B - The analyte was detected in both the laboratory method blank and the sample. The sample concentration was less than five times the amount reported in the blank.

B1 - The analyte was detected in both the sample tubing rinse blank and the sample. The sample concentration was less than five times the amount reported in the blank.

B2 - The analyte was detected in both the ambient sample blank and the sample. The sample concentration was less than five times the amount reported in the blank.

R - Ion abundance ratios did not meet criteria for compound identification and the analyte is considered undetected. Results may be due to interfering compounds eluting within a PCB retention time window or an interference coeluting with a PCB congener.

NQ - The result is not quantifiable. It cannot be determined whether the analyte is present.

Attachments:

Analytical Data Report Forms, AXYS Analytical Services, Inc.

F:\Docs\JOBS\787002\9952 Data Val Memo.doc

**ANALYTICAL DATA REPORT FORMS
AXYS ANALYTICAL SERVICES, INC.**

ANCHOR ENVIRONMENTAL

AQUEOUS SAMPLES

PCB CONGENERS ANALYSIS

AXYS METHOD: MLA-010

Data Package:

**9952
L5819 -7
L5850 -1 to -8**

Prepared for:

**James Keithly
Anchor Environmental
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USA**

Prepared by:

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CANADA**

Contact: Dr. M.C. Hamilton

SEPTEMBER 2003

ANCHOR ENVIRONMENTAL
Aqueous Samples

PCB CONGENERS ANALYSIS
AXYS Method: MLA-010
9952: L5819- 7
L5850-1 to 8

Project Name: KAISER

16 September, 2003

NARRATIVE:

This narrative describes the analysis of nine aqueous samples for the determination of polychlorinated biphenyl (PCB) congeners and PCB Aroclor equivalents.

SAMPLE RECEIPT AND STORAGE

Samples were received on the 8th and 16th of May 2003. Details of sample conditions upon receipt are provided on the Sample Receiving Record form included in this data package. The samples were stored at 4°C prior to extraction and analysis. Issues regarding client sample ID's are itemized below:

- Sample labels, AN-D14GW-030515, and, AN-D16GW-030515, did not agree with the sample ID listed on the chain of custody (COC), AN-D14-030515, and, AN-D16-030515 respectively. Anchor Environmental designated the sample ID on the bottles to be correct version of the client sample identifier. The relevant e-mail correspondence is included in the Data Package.

SAMPLE PREPARATION

Sample AN-D14-030513 (AXYS ID L5819-7) was prepared by combining 500ml from each of samples RINSEATE SILICONE, and, RINSEATE TEFLON (AXYS IDs L5819-1 and L5819-2 respectively). These rinseate samples were in turn prepared at AXYS as described on the Sample Preparation Records included in this Data Package. AXYS ID L5819-7 was given the identification "AN-D14-030513" based on instructions from Anchor Environmental included in this Data Package.

Approximately 1L of the water samples were spiked with labeled quantification standards and liquid-liquid extracted with dichloromethane. The extracts were cleaned up using acid base silica, Florisil and alumina chromatographic columns. The final extracts were reduced in volume to 20µL and spiked with 2µL of the labelled recovery (internal) standard for a final volume of 22µL; 1 µL was injected.

Analyses were conducted in two batches named CLW9139 and CLWG9761, both of which contained a blank sample and a laboratory generated Ongoing Precision and Recovery (OPR) sample.

ANALYSIS

Samples and QC samples were analyzed in two batches. The composition of the batch is shown on the Batch list forms included in this data package.

Analysis procedures were in general accordance with 'USEPA Method 1668, Revision A: Chlorinated Biphenyl Congeners in Water, Soil, Sediment and Tissue by HRGC/HRMS' as documented in Axys method MLA-010 Rev. 4, a list of modifications to USEPA method 1668A is included in this data package. The PCB Aroclor equivalent concentrations were determined from the summed concentrations of specific PCB congeners, characteristic of the Aroclor formulation, multiplied by an empirically determined quantification factor, see Table 1.

Table 1. The following PCB congener sets and empirical factors were used:

Aroclor	PCB congeners	Quantification factor
1221	1, 3, 8	1.4
1232	1, 3, 30/18	3.4
1242	8, 30/18, 31, 28/20	3.0
1248	69/49, 44/47/65, 66	6.1
1254	83/99, 108/119/86/97/125/87	8.0
1260	183/185, 180/193, 170	5.0

Axys Analytical Services Ltd. follows the convention that a single Aroclor is reported only when its unique Aroclor pattern can be identified; otherwise, Aroclors are quantified and reported as a mixture of the Aroclors 1242, 1254, & 1260.

Instrumental analysis was conducted by high-resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS) using an AUTOSPEC ULTIMA high resolution MS equipped with an HP 6890 gas chromatograph, a CTC auto-sampler, and an Alpha data system running Micromass software. An SPB-Octyl (30 m, 0.25 mm i.d., 0.25 µm film thickness) chromatography column was coupled directly to the MS source. The MS was operated at a mass resolution of 10000 (static) in the electron impact ionization mode using multiple ion detection, acquiring at least two ions for each target and surrogate compound.

Target concentrations were determined by isotope dilution or internal standards using OPUSQUAN software.

Sample specific detection limits (SDLs) were determined from the analysis data by converting the average noise signal to a concentration following the same procedures used to convert target peak responses to concentrations.

Homologue totals were obtained by summing the concentration of all congeners with values greater than their detection limits. Where observed peaks failed the ion abundance ratio, the presence of the compound could not be confirmed and the peak was flagged as 'K'. These 'K' concentrations were not included in the homologue totals and toxic equivalency (TEQ) calculations. TEQs have been calculated using WHO 1998 TEFs.

4. REPORTING CONVENTIONS

The Axys contract number assigned for internal tracking was 9952. Samples were assigned a unique laboratory identifier of the form LXXXX-X, where 'X' are numerals; all data reports reference this unique Axys ID plus the client sample identifier.

Laboratory qualifier flags that may appear in this data package:

Cx = co-elutes with indicated congener, data is given under the lowest IUPAC designated congener in the group. Where 'x' denotes the IUPAC number of the lowest numerical designated congener.

E = exceeds calibrated linear range, see dilution data

K = identifies a target that could not be confirmed by virtue of not satisfying all method required criteria, the reported value may be interpreted as an estimated maximum analyte concentration

NQ = data not quantifiable

U = identifies a compound that was not detected

V = surrogate recovery is not within method control limits

Results are reported in concentration units of picograms per liter (pg/L.).

5. QA/QC NOTES

Sample and QC samples were analyzed in a single batch carried intact through the entire analytical process. The sample data were reviewed and evaluated in relation to the batch QC samples. All results fell within the quality acceptance specifications of the method and the contract, with the following exceptions:

CLWG9761

- Percent recoveries of some labeled standards were slightly below the method control limit in sample listed in the following table. It is AXYS experience that quantification was not impacted and the data are considered unaffected.

Sample	Labelled PCB surrogate affected
L5850-5	1
L5850-6	3
L5850-7	4,15, 19, 54, 28
WG9761-101	4, 19

- Surrogate recoveries of PCB 1L in sample L5850-6 (AN-D64GW-030515) indicate that mono-substituted PCBs were not recovered from the sample. Data were determined to be not quantifiable for mono-substituted PCBs and have been flagged as NQ.
- PCB's 7 and 11 were detected in the Lab Blank at concentrations slightly above the method's expectations. The blank levels for these congeners should be taken into account when evaluating data.

CLWG9139

- PCB's 44/47/65, 45/51, and 68 were detected in the Lab Blank at concentrations slightly above the method's expectations. The blank levels for these congeners should be taken into account when evaluating data.

ANALYTICAL DISCUSSION

Sample analyte concentrations are not blank corrected.

DATA PACKAGE

Included in the data package is the narrative and supporting documentations, sample data, laboratory blanks, OPR and instrument QC reports.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Signed: Jesse Kline, B.Sc., Project Chemist

17- SEP- 03
Date Signed

Analysis of PCB Congeners By USEPA Method 1668A

Samples are spiked with isotopically labelled surrogate standards, solvent extracted and cleaned up on a series of chromatographic columns which may include silica, Florisil, alumina and gel permeation columns. The final extract is spiked with isotopically labelled recovery (internal) standards prior to instrumental analysis. Analysis of the extract is performed on high-resolution mass spectrometer (HRMS) coupled to a high-resolution gas chromatograph (HRGC) equipped with a SPB-Octyl chromatography column (30 m, 0.25 mm i.d., 0.25 µm film thickness). Resolution of the PCB 156/157 coelution may be achieved by high resolution GC/MS using a DB-1 chromatography column (30 m, 0.25 mm id, 0.25 µm film thickness). The method is carried out in accordance with the protocols described in EPA Method 1668A, with the following modifications.

Method Modifications:

Section 2.1.3, 12.4, 11.5, 12.3

To avoid any disproportionate loss of the labeled versus native PCB congeners (some PCB congeners are highly volatile) during the equilibration and grinding steps the sample is mixed with sodium sulfate, dried to produce a free flowing powder (minimum thirty minutes), ground manually, and spiked with the labeled compounds.

The extracting solvent for tissues is changed to dichloromethane to minimize loss of volatile components.

To avoid interference in the mono- and di-chlorinated congeners from a toluene by-product occasionally formed, the extraction solvent for solids is changed to dichloromethane.

Section 7.12, 7.13, 9.0, 11.0

The concentration of the labelled toxics/LOC and the clean-up standard spiking solutions is 100 ng/mL and the sample spiking volume is 20 µL. The resulting final concentrations in the extracts are as specified in the method.

Section 12.4.9

To prevent excessive loss of volatile compounds in the extract used for PCB determination, the gravimetric lipid determination is performed on a subsample of the total extract. If alignment of the lipid determination with a particular procedure is required (i.e. solvent other than dichloromethane), the percent lipid is determined as a separate analysis using another subsample of tissue.

Table 2, page 77 and page 78

For consistency with procedures for similar congeners and general method instructions, the retention time references used for PCB 74 and PCB 92 are ¹³C-PCB 81 and ¹³C-PCB 104 respectively.

Table 2, page 80, page 81

For consistency with procedures for other labelled compounds, the RT windows used for ¹³C-PCB 156/157 and ¹³C-PCB 169 are 20 seconds. For consistency with general method instructions those hexachlorinated congeners not present in the toxic/LOC/window defining mix are quantified using the average response of all labeled compounds (155L/156L/157L/167L/169L) for that level of chlorination.

Table 3, page 87

The concentrations of native PCBs in the combined 209 congener calibration solution are 25, 50 and 75 µg/mL respectively, as described in Section 7.10.2.1.2.

Table 3, page 93

The labeled compound acceptance ranges for PCBs 1L and 3L in OPRs, IPRs, and samples have been lowered to 20% in recognition of the higher volatility of these compounds.

Table 8, page 99

To minimize the possibility of interference, the M+4 and M+6 ions are used for quantification of ¹³C-PCB 209. The theoretical ion abundance ratio is 1.16. The QC limit is 0.99-1.33.

Section 17.0

$Conc_i$ - the concentrations of target analytes, and the labelled compound concentrations and recoveries, are calculated using the equations below. These procedures are equivalent to those described in the method but are more direct.

$$Conc_i = \frac{A_i}{A_{si}} \times \frac{M_{si}}{RRF_{i,si}} \times \frac{1}{M_x}$$

- where A_i = summed areas of the primary and secondary m/z's for the analyte peak of interest (compound i)
 A_{si} = summed areas of the primary and secondary m/z's for the labelled surrogate peak used to quantify i)
 M_x = mass of sample taken for analysis
 M_{si} = mass of labelled surrogate (compound si) added to sample as calculated by the concentration of standard spiked (pg/mL) multiplied by the volume spiked (mL)
 $RRF_{i,si}$ = mean relative response factor of i to si from the five-point calibration range and defined individually as:

$$\frac{A_i}{A_{si}} \times \frac{M_{si}}{M_i}$$

Calculation of Surrogate Standard Concentrations and Percent Recoveries:
 Concentrations of surrogate standards are calculated using the following equation:

$$Conc_{si} = \frac{A_{si}}{A_{rs}} \times \frac{M_{rs}}{RRF_{si,rs}}$$

and, the percent recoveries of the surrogate standards are calculated using the following equation:

$$\% \text{Recovery} = \frac{A_{sl}}{A_{rs}} \times \frac{M_{rs}}{RRF_{sl,rs}} \times \frac{1}{M_{sl}} \times 100$$

where A_{rs} and A_{sl} are the summed peak areas (from the primary and secondary m/z channels) of recovery standard and labelled surrogate added to the sample; M_{rs} and M_{sl} are the masses of recovery standard and labelled surrogate added to the sample, and;
 $RRF_{sl,rs}$ is the mean relative response factor of the labelled surrogate to the recovery standard as determined by the five-point calibration range and defined individually as:

$$\frac{A_{sl}}{A_{rs}} \times \frac{M_{rs}}{M_{sl}}$$

James Keithly
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Seattle WA 98101

COVER PAGE - PCB CONGENERS ANALYSIS

Lab Name: AXYS Analytical Services Ltd.	Contract No: 9952
Project No: KAISER	AXYS Methods: MLA-010
Industrial Category: NA	Program: Aqueous Samples

Client Sample Number	Lab Sample Identification
LAB BLANK	WG9139-101
OPR	WG9139-102
AN-D14TB-030515	L5850-1
AN-D16TB-030515	L5850-2
AN-D14GW-030515	L5850-3
AN-D16GW-030515	L5850-4
AN-EW50GW-030612	L5850-8
LAB BLANK	WG9761-101
OPR	WG9761-102
AN-D14RB-030513	L5819-7
AN-D66GW-030515	L5850-5
AN-D64GW-030515	L5850-6
AN-EWGW-030612	L5850-7

Comments: Narrative Report is attached. (yes)

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the Narrative Report.

Release of the data contained in this hardcopy data package (and in the data submitted on magnetic media, if data are submitted on magnetic media), has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:	Name: Jesse Kline
Date: September 2003	Title: Project Chemist

CORRELATION BETWEEN CLIENT SAMPLE NUMBERS AND AXYS SAMPLE LOGIN NUMBERS

Client Sample Number	AXYS Sample Identification
AN-D14RB-030513	L5819-7
AN-D14TB-030515	L5850-1
AN-D16TB-030515	L5850-2
AN-D14GW-030515	L5850-3
AN-D16GW-030515	L5850-4
AN-D66GW-030515	L5850-5
AN-D64GW-030515	L5850-6
AN-EWGW-030612	L5850-7
AN-EW50GW-030612	L5850-8

SAMPLE NO. AN-D14RB-030513

Tubing Blanks

AXYS METHOD MLA-010 Rev 04

1668A-S1_209

Form 1A
PCB CONGENER ANALYSIS REPORT

 CLIENT ID:
AN-D14RB-030513

Sample Collection: N/A

Lab Name: AXYS ANALYTICAL SERVICES

Contract No.:	9952	Lab Sample ID:	L5819-7
Matrix:	AQUEOUS	Sample Size:	0.979 L
Sample Receipt Date:	N/A	Initial Calibration Date:	19-Jun-2003
Extraction Date:	18-Jul-2003	Instrument ID:	HR GC/MS
Analysis Date:	25-Jul-2003	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Sample Data Filename:	PB3C_393 S:4
Injection Volume (µL):	1.0	Blank Data Filename:	PB3C_392 S:7
Dilution Factor:	N/A	Cal. Ver. Data Filename:	PB3C_393 S:1
Concentration Units :	pg/L		

COMPOUND	IUPAC NO.	CO-ELOTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2 - MoCB	1		K	7.98 <i>UR</i>	0.912	2.58	1.000
3 - MoCB	2		K	4.54 <i>UR</i>	1.13	2.54	0.988
4 - MoCB	3			9.67	1.08	2.91	1.000
2,2' - DICB	4			6.50	1.64	1.39	1.000
2,3 - DICB	5		U		1.28		
2,3' - DICB	6		K	2.98 <i>UR</i>	1.18	0.95	1.175
2,4 - DICB	7			7.66	1.17	1.35	1.158
2,4' - DICB	8			7.27	1.11	1.46	1.207
2,5 - DICB	9		K	1.97 <i>UR</i>	1.17	0.76	1.144
2,6 - DICB	10		U		1.21		
3,3' - DICB	11			15.1	1.29	1.51	0.970
3,4 - DICB	12	12 + 13	CK	1.92 <i>UR</i>	1.26	0.61	0.984
3,4' - DICB	13	12 + 13	C12				
3,5 - DICB	14		U		1.26		
4,4' - DICB	15			3.43	1.61	1.41	1.000
2,2',3 - TrICB	16			2.31	0.445	1.06	1.168
2,2',4 - TrICB	17			2.57	0.383	1.02	1.138
2,2',5 - TrICB	18	18 + 30	C	4.86	0.312	1.05	1.115
2,2',6 - TrICB	19			1.73	0.433	0.91	1.002
2,3,3' - TrICB	20	20 + 28	C	4.56	0.280	1.01	0.848

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Approved by Rawsthorne QA/QC Chemist
 28-08-2003
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Lab Sample ID:

L5819-7

Sample Data Filename:

PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELOTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,4 - TrICB	21	21 + 33	C	3.82	0.271	1.10	0.856
2,3,4' - TrICB	22			1.33	0.311	1.08	0.872
2,3,5 - TrICB	23		U		0.286		
2,3,6 - TrICB	24		K	0.385 <i>UR</i>	0.267	1.44	1.158
2,3',4 - TrICB	25		K	0.648 <i>UR</i>	0.253	1.52	0.825
2,3',5 - TrICB	26	26 + 29	C	0.823	0.289	0.92	1.301
2,3',6 - TrICB	27		K	0.377 <i>UR</i>	0.261	1.34	1.152
2,4,4' - TrICB	28	20 + 28	C20				
2,4,5 - TrICB	29	26 + 29	C26				
2,4,6 - TrICB	30	18 + 30	C18				
2,4',5 - TrICB	31			4.15	0.278	1.19	0.837
2,4',6 - TrICB	32			1.28	0.270	1.16	1.198
2',3,4 - TrICB	33	21 + 33	C21				
2',3,5 - TrICB	34		U		0.293		
3,3',4 - TrICB	35		U		0.299		
3,3',5 - TrICB	36		U		0.290		
3,4,4' - TrICB	37			1.33	0.318	1.04	1.001
3,4,5 - TrICB	38		U		0.302		
3,4',5 - TrICB	39		U		0.287		
2,2',3,3' - TeCB	40	40 + 41 + 71	C	1.64	0.158	0.83	1.336
2,2',3,4 - TeCB	41	40 + 41 + 71	C40				
2,2',3,4' - TeCB	42		K	0.758 <i>UR</i>	0.166	0.98	1.311
2,2',3,5 - TeCB	43		U		0.182		
2,2',3,5' - TeCB	44	44 + 47 + 65	C	48.8	0.146	0.79	1.287
2,2',3,6 - TeCB	45	45 + 51	C	26.4	0.156	0.81	1.149
2,2',3,6' - TeCB	46		K	0.242 <i>UR</i>	0.188	0.45	1.161
2,2',4,4' - TeCB	47	44 + 47 + 65	C44				
2,2',4,5 - TeCB	48		K	0.563 <i>UR</i>	0.157	1.05	1.273
2,2',4,5' - TeCB	49	49 + 69	C	2.72	0.137	0.78	1.259
2,2',4,6 - TeCB	50	50 + 53	C	0.669	0.150	0.86	1.110
2,2',4,6' - TeCB	51	45 + 51	C45				
2,2',5,5' - TeCB	52			4.03	0.155	0.86	1.234
2,2',5,6' - TeCB	53	50 + 53	C50				
2,2',6,6' - TeCB	54		K	0.169 <i>UR</i>	0.129	0.30	1.001
2,3,3',4 - TeCB	55		U		0.633		
2,3,3',4' - TeCB	56		K	0.788 <i>UR</i>	0.558	1.08	0.904
2,3,3',5 - TeCB	57		U		0.516		
2,3,3',5' - TeCB	58		U		0.518		
2,3,3',6 - TeCB	59	59 + 62 + 75	CK	0.282 <i>UR</i>	0.120	2.16	1.302
2,3,4,4' - TeCB	60		U		0.551		
2,3,4,5 - TeCB	61	61 + 70 + 74 + 76	C	4.06	0.519	0.85	0.875
2,3,4,6 - TeCB	62	59 + 62 + 75	C59				
2,3,4',5 - TeCB	63		U		0.520		

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Lab Sample ID:

L5819-7

Sample Data Filename:

PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,4',8 - TeCB	64		K	1.19 <i>UR</i>	0.116	0.63	1.348
2,3,5,8 - TeCB	65	44 + 47 + 65	C44				
2,3',4,4' - TeCB	66		K	2.32 <i>UR</i>	0.531	0.61	0.885
2,3',4,5 - TeCB	67		U		0.461		
2,3',4,5' - TeCB	68			19.4	0.471	0.75	0.831
2,3',4,8 - TeCB	69	49 + 69	C49				
2,3',4,5 - TeCB	70	61 + 70 + 74 + 76	C61				
2,3',4',8 - TeCB	71	40 + 41 + 71	C40				
2,3',5,5' - TeCB	72		U		0.495		
2,3',5,6 - TeCB	73		U		0.117		
2,4,4',5 - TeCB	74	61 + 70 + 74 + 76	C61				
2,4,4',8 - TeCB	75	59 + 62 + 75	C59				
2',3,4,5 - TeCB	76	61 + 70 + 74 + 76	C61				
3,3',4,4' - TeCB	77		K	0.748 <i>UR</i>	0.829	1.31	1.001
3,3',4,5 - TeCB	78		U		0.592		
3,3',4,5' - TeCB	79		U		0.475		
3,3',5,5' - TeCB	80		U		0.517		
3,4,4',5 - TeCB	81		U		0.805		
2,2',3,3',4 - PeCB	82		U		0.338		
2,2',3,3',5 - PeCB	83	83 + 99	C	1.80	0.295	1.76	1.261
2,2',3,3',6 - PeCB	84		K	0.832 <i>UR</i>	0.331	2.48	1.164
2,2',3,4,4' - PeCB	85	85 + 116 + 117	CK	0.727 <i>UR</i>	0.249	0.97	1.310
2,2',3,4,5 - PeCB	86	86 + 87 + 97 + 108 + 119 + 125	C	2.21	0.249	1.34	1.284
2,2',3,4,5' - PeCB	87	86 + 87 + 97 + 108 + 119 + 125	C86				
2,2',3,4,6 - PeCB	88	88 + 91	CK	0.446 <i>UR</i>	0.285	2.04	1.154
2,2',3,4,6' - PeCB	89		U		0.309		
2,2',3,4',5 - PeCB	90	90 + 101 + 113	CK	3.25 <i>UR</i>	0.255	1.87	1.238
2,2',3,4',6 - PeCB	91	88 + 91	C88				
2,2',3,5,5' - PeCB	92			0.647	0.297	1.35	0.853
2,2',3,5,6 - PeCB	93	93 + 95 + 98 + 100 + 102	CU		0.274		
2,2',3,5,6' - PeCB	94		U		0.296		
2,2',3,5',6 - PeCB	95	93 + 95 + 98 + 100 + 102	C93				
2,2',3,6,6' - PeCB	96		U		0.202		
2,2',3',4,5 - PeCB	97	86 + 87 + 97 + 108 + 119 + 125	C86				
2,2',3',4,6 - PeCB	98	93 + 95 + 98 + 100 + 102	C93				
2,2',4,4',5 - PeCB	99	83 + 99	C83				
2,2',4,4',6 - PeCB	100	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,5' - PeCB	101	90 + 101 + 113	C90				
2,2',4,5,6' - PeCB	102	93 + 95 + 98 + 100 + 102	C93				
2,2',4,6,6' - PeCB	103		U		0.250		
2,2',4,6,6' - PeCB	104		U		0.221		
2,3,3',4,4' - PeCB	105			1.82	0.436	1.52	1.000
2,3,3',4,5 - PeCB	106		U		0.419		

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Lab Sample ID:

L5819-7

CLIENT ID:

AN-D14RB-030513

Sample Data Filename:

PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,3',4',5 - PeCB	107	107 + 124	C U		0.428		
2,3,3',4,5' - PeCB	108	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3,3',4,6 - PeCB	109		U		0.385		
2,3,3',4',6 - PeCB	110	110 + 115	C K	2.72 <i>UR</i>	0.215	1.27	1.317
2,3,3',5,5' - PeCB	111		U		0.222		
2,3,3',5,6 - PeCB	112		U		0.218		
2,3,3',5,8 - PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5 - PeCB	114		U		0.413		
2,3,4,4',6 - PeCB	115	110 + 115	C110				
2,3,4,5,6 - PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6 - PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5 - PeCB	118			3.01	0.397	1.73	1.000
2,3',4,4',6 - PeCB	119	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3',4,5,5' - PeCB	120		U		0.217		
2,3',4,5,8 - PeCB	121		U		0.212		
2',3,3',4,5 - PeCB	122		U		0.464		
2',3,4,4',5 - PeCB	123		U		0.408		
2',3,4,5,5' - PeCB	124	107 + 124	C107				
2',3,4,5,6' - PeCB	125	86 + 87 + 97 + 108 + 119 + 125	C86				
3,3',4,4',5 - PeCB	126		U		0.514		
3,3',4,5,5' - PeCB	127		U		0.435		
2,2',3,3',4,4' - HxCB	128	128 + 186	C	0.653	0.260	1.32	0.959
2,2',3,3',4,5 - HxCB	129	129 + 138 + 160 + 163	C	4.76	0.256	1.39	0.929
2,2',3,3',4,5' - HxCB	130		U		0.333		
2,2',3,3',4,6 - HxCB	131		U		0.308		
2,2',3,3',4,8' - HxCB	132		K	1.34 <i>UR</i>	0.318	1.82	1.174
2,2',3,3',5,5' - HxCB	133		U		0.301		
2,2',3,3',5,6 - HxCB	134	134 + 143	C U		0.309		
2,2',3,3',5,6' - HxCB	135	135 + 151 + 154	C	1.80	0.113	1.33	1.103
2,2',3,3',6,6' - HxCB	136			0.842	0.0872	1.08	1.024
2,2',3,4,4',5 - HxCB	137		U		0.286		
2,2',3,4,4',5' - HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6 - HxCB	139	139 + 140	C U		0.278		
2,2',3,4,4',6' - HxCB	140	139 + 140	C139				
2,2',3,4,5,5' - HxCB	141			1.02	0.293	1.35	0.804
2,2',3,4,5,6 - HxCB	142		U		0.319		
2,2',3,4,5,6' - HxCB	143	134 + 143	C134				
2,2',3,4,5',6 - HxCB	144		K	0.347 <i>UR</i>	0.117	0.55	1.121
2,2',3,4,6,6' - HxCB	145		U		0.0879		
2,2',3,4',5,5' - HxCB	146			0.718	0.270	1.08	0.885
2,2',3,4',5,6 - HxCB	147	147 + 149	C	3.86	0.280	1.41	1.133
2,2',3,4',5,6' - HxCB	148		U		0.118		
2,2',3,4',5,8 - HxCB	149	147 + 149	C147				

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Approved by: *JR* QA/QC Chemist28-08-2003
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Lab Sample ID:

L5819-7

Sample Data Filename:

PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,2',3,4',8,8' - HxCB	150		U		0.0836		
2,2',3,5,5',6 - HxCB	151	135 + 151 + 154	C135				
2,2',3,5,6,6' - HxCB	152		U		0.0816		
2,2',4,4',5,5' - HxCB	153	153 + 168	C	4.43	0.232	1.34	0.899
2,2',4,4',5,6' - HxCB	154	135 + 151 + 154	C135				
2,2',4,4',6,6' - HxCB	155		K	0.146 <i>UR</i>	0.0754	3.47	1.001
2,3,3',4,4',5 - HxCB	156	156 + 157	C	1.01	0.279	1.42	1.000
2,3,3',4,4',5' - HxCB	157	156 + 157	C156				
2,3,3',4,4',6 - HxCB	158		K	0.690 <i>UR</i>	0.211	1.63	0.938
2,3,3',4,5,5' - HxCB	159		U		0.228		
2,3,3',4,5,6 - HxCB	160	129 + 138 + 160 + 163	C129				
2,3,3',4,5',6 - HxCB	161		U		0.219		
2,3,3',4',5,5' - HxCB	162		U		0.226		
2,3,3',4',5,6 - HxCB	163	129 + 138 + 160 + 163	C129				
2,3,3',4',5',6 - HxCB	164		K	0.328 <i>UR</i>	0.230	1.43	0.921
2,3,3',5,5',6 - HxCB	165		U		0.239		
2,3,4,4',5,6 - HxCB	166	128 + 166	C128				
2,3',4,4',5,5' - HxCB	167		K	0.477 <i>UR</i>	0.206	1.63	1.001
2,3',4,4',5,6 - HxCB	168	153 + 168	C153				
3,3',4,4',5,5' - HxCB	169		U		0.386		
2,2',3,3',4,4',5 - HpCB	170			1.08	0.0793	0.94	0.937
2,2',3,3',4,4',6 - HpCB	171	171 + 173	CK	0.926 <i>UR</i>	0.0765	1.79	1.162
2,2',3,3',4,5,5' - HpCB	172		K	0.163 <i>UR</i>	0.0778	0.88	0.898
2,2',3,3',4,5,6 - HpCB	173	171 + 173	C171				
2,2',3,3',4,5,6' - HpCB	174			2.03	0.0706	0.94	1.133
2,2',3,3',4,5',6 - HpCB	175		U		0.0683		
2,2',3,3',4,6,6' - HpCB	176		K	0.219 <i>UR</i>	0.0520	0.89	1.033
2,2',3,3',4',5,6 - HpCB	177		K	0.832 <i>UR</i>	0.0736	1.48	1.145
2,2',3,3',5,5',6 - HpCB	178		K	0.338 <i>UR</i>	0.0707	0.51	1.085
2,2',3,3',5,6,6' - HpCB	179		K	0.582 <i>UR</i>	0.0505	0.76	1.009
2,2',3,4,4',5,5' - HpCB	180	180 + 193	C	3.09	0.0618	0.99	0.911
2,2',3,4,4',5,6 - HpCB	181		U		0.0691		
2,2',3,4,4',5,6' - HpCB	182		U		0.0687		
2,2',3,4,4',5,6 - HpCB	183	183 + 185	C	1.30	0.0680	1.01	1.126
2,2',3,4,4',6,6' - HpCB	184		K	0.142 <i>UR</i>	0.0477	0.52	1.025
2,2',3,4,5,5',6 - HpCB	185	183 + 185	C183				
2,2',3,4,5,6,6' - HpCB	186		U		0.0524		
2,2',3,4',5,5',6 - HpCB	187			1.87	0.0635	0.91	1.109
2,2',3,4',5,6,6' - HpCB	188		K	0.081 <i>UR</i>	0.0506	0.56	1.001
2,3,3',4,4',5,5' - HpCB	189			0.511	0.0409	1.09	1.000
2,3,3',4,4',5,6 - HpCB	190		K	0.298 <i>UR</i>	0.0585	0.23	0.947
2,3,3',4,4',5,6 - HpCB	191		K	0.235 <i>UR</i>	0.0568	1.70	0.918
2,3,3',4,5,5',6 - HpCB	192		U		0.0603		

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Approved by: JRW QA/QC Chemist28-08-2003
dd-mm-yyyy

Lab Sample ID:

L5819-7

CLIENT ID:

AN-D14RB-030513

Sample Data Filename:

PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELOTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,3',4,5,5',6 - HpCB	193	180 + 193	C180				
2,2',3,3',4,4',5,5' - OcCB	194		K	0.603 <i>UR</i>	0.0555	0.72	0.991
2,2',3,3',4,4',5,6 - OcCB	195		K	0.240 <i>UR</i>	0.0591	0.37	0.946
2,2',3,3',4,4',5,6' - OcCB	196		K	0.270 <i>UR</i>	0.0820	1.13	0.916
2,2',3,3',4,4',6,6' - OcCB	197	197 + 200	CK	0.249 <i>UR</i>	0.0612	0.75	1.045
2,2',3,3',4,5,5',6 - OcCB	198	198 + 199	CK	0.444 <i>UR</i>	0.0826	0.68	1.114
2,2',3,3',4,5,5',6' - OcCB	199	198 + 199	C198				
2,2',3,3',4,5,6,6' - OcCB	200	197 + 200	C197				
2,2',3,3',4,5',6,6' - OcCB	201			0.140	0.0615	0.99	1.022
2,2',3,3',5,5',6,6' - OcCB	202		K	0.266 <i>UR</i>	0.0651	0.51	1.000
2,2',3,4,4',5,5',6 - OcCB	203		K	0.493 <i>UR</i>	0.0761	0.66	0.920
2,2',3,4,4',5,6,6' - OcCB	204			0.304	0.0628	0.79	1.038
2,3,3',4,4',5,5',6 - OcCB	205		K	0.465 <i>UR</i>	0.0459	1.08	1.000
2,2',3,3',4,4',5,5',6 - NoCB	206		K	0.653 <i>UR</i>	0.541	0.52	1.000
2,2',3,3',4,4',5,6,6' - NoCB	207		U		0.439		
2,2',3,3',4,5,5',6,6' - NoCB	208		U		0.467		
2,2',3,3',4,4',5,5',6,6' - DeCB	209			1.02	0.0600	0.67	1.001

(1) C = co-eluting congener; U = not detected; K = peak detected, but did not meet quantification criteria; E = exceeds calibrated linear range, see dilution data; D = dilution data; Z = compound not requested; X = results reported separately

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Approved by:  QA/QC Chemist28-08-2003
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Form 2
PCB CONGENER ANALYSIS REPORT

CLIENT ID:
AN-D14RB-030513

Lab Name: AXYS ANALYTICAL SERVICES		Sample Collection:	N/A	
Contract No.: 9952		Lab Sample ID:	L5819-7	
Matrix: AQUEOUS		Sample Size:	0.978	L
Sample Receipt Date: N/A		Initial Calibration Date:	19-Jun-2003	
Extraction Date: 18-Jul-2003		Instrument ID:	HR GC/MS	
Analysis Date: 25-Jul-2003		Time: 0:52:37	GC Column ID:	SPB-OCTYL
Extract Volume (µL): 22		Sample Datafile:	PB3C_393 S:4	
Injection Volume (µL): 1.0		Blank Data Filename:	PB3C_392 S:7	
Dilution Factor: N/A		Cal. Ver. Data Filename:	PB3C_393 S:1	
Concentration Units : pg absolute				

LABELED COMPOUND	IUPAC NO. ¹	CO-ELUTIONS	LAB FLAG ²	SPIKE CONC.	CONC. FOUND	R(%) ³	ION ABUND. RATIO	RRT
13C12-2 - MoCB	1L			2000	483	24.2	3.19	0.720
13C12-4 - MoCB	3L			2000	578	28.9	3.09	0.868
13C12-2,2' - DICB	4L			2000	773	38.6	1.57	0.874
13C12-4,4' - DICB	15L			2000	766	38.3	1.54	1.253
13C12-2,2',6 - TrICB	19L			2000	855	42.7	1.06	1.071
13C12-3,4,4' - TrICB	37L			2000	1110	55.3	1.03	1.091
13C12-2,2',8,8' - TeCB	54L			2000	880	44.0	0.81	0.811
13C12-3,3',4,4' - TeCB	77L			2000	1300	65.1	0.76	1.396
13C12-3,4,4',5 - TeCB	81L			2000	1310	65.4	0.77	1.372
13C12-2,2',4,6,6' - PeCB	104L			2000	1050	52.6	1.53	0.808
13C12-2,3,3',4,4' - PeCB	105L			2000	1600	80.0	1.60	1.200
13C12-2,3,4,4',5 - PeCB	114L			2000	1600	80.2	1.56	1.179
13C12-2,3',4,4',5 - PeCB	118L			2000	1660	82.8	1.57	1.161
13C12-2',3,4,4',5 - PeCB	123L			2000	1650	82.5	1.58	1.151
13C12-3,3',4,4',5 - PeCB	126L			2000	1570	78.3	1.58	1.300
13C12-2,2',4,4',6,6' - HxCB	155L			2000	1350	67.4	1.30	0.786
13C12-2,3,3',4,4',5 - HxCB	158L	156L + 157L	C	4000	3280	82.1	1.30	1.107
13C12-2,3,3',4,4',5' - HxCB	157L	156L + 157L	C156L					
13C12-2,3',4,4',5,5' - HxCB	167L			2000	1690	84.7	1.28	1.077
13C12-3,3',4,4',5,5' - HxCB	169L			2000	1510	75.6	1.29	1.191
13C12-2,2',3,3',4,4' - HpCB	170L			2000	1730	86.3	1.07	0.897
13C12-2,2',3,4,4',5,5' - HpCB	180L			2000	1750	87.6	1.07	0.873
13C12-2,2',3,4',5,6,6' - HpCB	188L			2000	1680	83.8	1.09	0.713
13C12-2,3,3',4,4',5,5' - HpCB	189L			2000	1720	85.8	1.05	0.959
13C12-2,2',3,3',5,5',6,6' - OcCB	202L			2000	1950	97.3	0.94	0.818
13C12-2,3,3',4,4',5,5',6 - OcCB	205L			2000	1700	84.9	0.92	1.009
13C12-2,2',3,3',4,4',5,5',6 - NoCB	208L			2000	1700	84.9	0.80	1.044
13C12-2,2',3,3',4,5,5',6,6' - NoCB	208L			2000	1760	87.9	0.83	0.949
13C12-2,2',3,3',4,4',5,5',6,6' - DeCB	208L			2000	1720	86.1	1.19	1.075

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Approved by:  QA/QC Chemist

28-08-2003
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Form 2 (Continued)
PCB CONGENER ANALYSIS REPORT

CLIENT ID:
AN-D14RB-030513

Lab Name:	AXYS ANALYTICAL SERVICES	Sample Collection:	N/A
Contract No.:	9952	Lab Sample ID:	L5819-7
Matrix:	AQUEOUS	Sample Size:	0.979 L
Sample Receipt Date:	N/A	Initial Calibration Date:	19-Jun-2003
Extraction Date:	18-Jul-2003	Instrument ID:	HR GC/MS
Analysis Date:	25-Jul-2003	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Sample Datafile:	PB3C_393 S:4
Injection Volume (µL):	1.0	Blank Data Filename:	PB3C_392 S:7
Dilution Factor:	N/A	Cal. Ver. Data Filename:	PB3C_393 S:1
Concentration Units :	pg absolute		

CLEAN-UP STANDARD	IUPAC NO. ¹	LAB FLAG ²	SPIKE CONC.	CONC. FOUND	R(%) ³	ION ABUND. RATIO	RRT
13C12- 2,4,4' - TriCB	28L		2000	1090	54.6	1.04	0.925
13C12-2,3,3',5,5' - PeCB	111L		2000	1510	75.5	1.61	1.087
13C12-2,2',3,3',5,5',6 - HpCB	178L		2000	1620	80.8	1.09	1.012

(1) Suffix "L" indicates labeled compound

(2) C = co-eluting congener; E = exceeds calibrated linear range, see dilution data; D = dilution data; Z = compound not requested; X = results reported separately
(3) R% = percent recovery of labeled compounds

Form 1A
HOMOLOGUE TOTAL POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS REPORT

		Sample Collection:	N/A
Lab Name:	AXYS ANALYTICAL SERVICES		
Contract No.:	9952	Lab Sample ID:	L5819-7
Matrix:	AQUEOUS	Sample Size:	0.979 L
Sample Receipt Date:	N/A	Initial Calibration Date:	19-Jun-2003
Extraction Date:	18-Jul-2003	Instrument ID:	HR GC/MS
Analysis Date:	25-Jul-2003	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Blank Data Filename:	PB3C_392 S:7
Injection Volume (µL):	1.0	Cal. Ver. Data Filename:	PB3C_393 S:1
Dilution Factor:	N/A	Sample Datafile(s):	PB3C_393 S:4
Concentration Units :	pg/L		
PCB HOMOLOGUE GROUP	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT
Total Monochloro Biphenyls		9.67	1.13
Total Dichloro Biphenyls		40.0	1.64
Total Trichloro Biphenyls		28.6	0.445
Total Tetrachloro Biphenyls		108	0.629
Total Pentachloro Biphenyls		9.49	0.514
Total Hexachloro Biphenyls		19.1	0.386
Total Heptachloro Biphenyls		9.86	0.0793
Total Octachloro Biphenyls		0.444	0.0826
Total Nonachloro Biphenyls	U		0.541
Decachloro Biphenyl		1.02	0.0600
TOTAL PCBs		226	

(1) U = Not detected

(2) All header information pertains to the initial instrumental analysis of the sample extract.

Additional sample datafiles listed refer to secondary analysis of the sample extract.

Form 1C
PCB CONGENER TEQ ANALYSIS REPORT

Lab Name:	AXYS ANALYTICAL SERVICES	Sample Collection:	N/A
Contract No.:	9952		
Matrix:	AQUEOUS	Lab Sample ID:	L5819-7
Sample Size:	0.979 L	GC Column ID(s):	SPB-OCTYL
Concentration Units :	pg/L	Sample Datafile(s):	PB3C_393 S:4

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	WHO 1998 TEF	TEQ	
							U=1/2 DL	U=0
3,3',4,4'-TetraCB	77		U		0.629	0.0001	3.15E-05	0.00E+00
3,4,4',5-TetraCB	81		U		0.605	0.0001	3.03E-05	0.00E+00
2,3,3',4,4'-PentaCB	105			1.82	0.436	0.0001	1.82E-04	1.82E-04
2,3,4,4',5-PentaCB	114		U		0.413	0.0005	1.03E-04	0.00E+00
2,3',4,4',5-PentaCB	118			3.01	0.397	0.0001	3.01E-04	3.01E-04
2',3,4,4',5-PentaCB	123		U		0.408	0.0001	2.04E-05	0.00E+00
3,3',4,4',5-PentaCB	126		U		0.514	0.1	2.57E-02	0.00E+00
2,3,3',4,4',5-HexaCB	156	156 + 157	C	1.01	0.279	0.0005	5.03E-04	5.03E-04
2,3,3',4,4',5'-HexaCB	157	156 + 157	C156					
2,3',4,4',5,5'-HexaCB	167		U		0.206	0.00001	1.03E-06	0.00E+00
3,3',4,4',5,5'-HexaCB	169		U		0.386	0.01	1.93E-03	0.00E+00
2,2',3,3',4,4',5-HeptaCB	170		Z					
2,2',3,4,4',5,5'-HeptaCB	180	180 + 193	Z					
2,3,3',4,4',5,5'-HeptaCB	189			0.511	0.0409	0.0001	5.11E-05	5.11E-05
2,3,3',4,4',5,5',6-HeptaCB	193	180 + 193	Z					
						TOTAL TEQ	0.0288	0.00104

(1) C = co-eluting congener; U = not detected; Z = compound not requested

(2) Concentrations that do not meet quantification criteria are not included in the TEQ calculations.

Form 1A
PCB AROCLOR EQUIVALENT ANALYSIS REPORT

CLIENT ID:
AN-D14RB-030513

Sample Collection: N/A

Lab Name: AXYS ANALYTICAL SERVICES

Contract No.:	9952	Lab Sample ID:	L5819-7
Matrix:	AQUEOUS	Sample Size:	0.979 L
Sample Receipt Date:	N/A	Initial Calibration Date:	19-Jun-2003
Extraction Date:	18-Jul-2003	Instrument ID:	HR GC/MS
Analysis Date:	25-Jul-2003	Time: 0:52:37	GC Column ID: SPB-OCTYL
Extract Volume (µL):	22	Blank Data Filename:	PB3C_392 S:7
Injection Volume (µL):	1.0	Cal. Ver. Data Filename:	PB3C_393 S:1
Dilution Factor:	N/A	Sample Datafile(s):	PB3C_393 S: 4
Concentration Units:	pg/L		

COMPOUND	CAS NO.	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT
Aroclor 1016	12674-11-2	Z		
Aroclor 1221	11104-28-2	U		1.55
Aroclor 1232	11141-16-5	U		3.66
Aroclor 1242	53469-21-9		62.5	3.33
Aroclor 1248	12672-29-6	U		3.24
Aroclor 1254	11097-69-1		32.1	2.36
Aroclor 1260	11096-82-5		27.2	0.397

(1) U = not detected; E = exceeds calibrated linear range, see dilution data; D = dilution data; Z = compound not requested; X = results reported separately

(2) PCB Aroclor equivalents were calculated from individual PCB congener concentrations using empirically determined conversion factors.

(3) All header information pertains to the initial instrumental analysis of the sample extract.

Additional sample datafiles listed refer to secondary analysis of the sample extract.

SAMPLE NO. AN-D14TB-030515

Ambient Blank

Sample Collection: N/A

Lab Name: AXYS ANALYTICAL SERVICES

Contract No.:	9952	Lab Sample ID:	L5850-1		
Matrix:	AQUEOUS	Sample Size:	0.931 L		
Sample Receipt Date:	16-May-2003	Initial Calibration Date:	19-Jun-2003		
Extraction Date:	30-Jun-2003	Instrument ID:	HR GC/MS		
Analysis Date:	07-Jul-2003	Time:	1:09:55	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Sample Data Filename:	PB3C_357 S:5		
Injection Volume (µL):	1.0	Blank Data Filename:	PB3C_357 S:4		
Dilution Factor:	N/A	Cal. Ver. Data Filename:	PB3C_357 S:1		
Concentration Units :	pg/L				

COMPOUND	IUPAC NO.	CO-ELOTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2 - MoCB	1		K	1.35 <i>UR</i>	0.222	2.57	1.001
3 - MoCB	2			1.76	0.293	2.72	0.988
4 - MoCB	3		K	2.38 <i>UR</i>	0.324	4.51	1.000
2,2' - DICB	4		U		1.21		
2,3 - DICB	5		U		0.970		
2,3' - DICB	6		U		0.872		
2,4 - DICB	7		U		0.842		
2,4' - DICB	8		K	2.05 <i>UR</i>	0.795	1.25	1.207
2,5 - DICB	9		U		0.873		
2,6 - DICB	10		U		0.862		
3,3' - DICB	11		K	5.54 <i>UR</i>	0.970	1.28	0.970
3,4 - DICB	12	12 + 13	CU		0.959		
3,4' - DICB	13	12 + 13	C12				
3,5 - DICB	14		U		0.929		
4,4' - DICB	15		U		1.28		
2,2',3 - TrICB	16		K	0.921 <i>UR</i>	0.595	1.24	1.166
2,2',4 - TrICB	17		K	1.03 <i>UR</i>	0.542	0.67	1.139
2,2',5 - TrICB	18	18 + 30	CK	2.44 <i>UR</i>	0.441	0.76	1.114
2,2',6 - TrICB	19		U		0.586		
2,3,3' - TrICB	20	20 + 28	C	1.79	0.401	1.01	0.847

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Lab Sample ID:

L5850-1

CLIENT ID:

AN-D14TB-030515

Sample Data Filename:

PB3C_357 S:5

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,4 - TrICB	21	21 + 33	C	1.16	0.387	0.91	0.857
2,3,4' - TrICB	22			0.814	0.445	0.91	0.872
2,3,5 - TrICB	23		U		0.407		
2,3,6 - TrICB	24		U		0.381		
2,3',4 - TrICB	25		U		0.357		
2,3',5 - TrICB	26	26 + 29	C U		0.407		
2,3',6 - TrICB	27		U		0.376		
2,4,4' - TrICB	28	20 + 28	C20				
2,4,5 - TrICB	29	26 + 29	C26				
2,4,6 - TrICB	30	18 + 30	C18				
2,4',5 - TrICB	31			1.64	0.395	1.08	0.836
2,4',6 - TrICB	32			0.501	0.390	1.14	1.198
2',3,4 - TrICB	33	21 + 33	C21				
2',3,5 - TrICB	34		U		0.411		
3,3',4 - TrICB	35		U		0.465		
3,3',5 - TrICB	36		U		0.421		
3,4,4' - TrICB	37		K	0.512 <i>UR</i>	0.478	0.82	0.999
3,4,5 - TrICB	38		U		0.427		
3,4',5 - TrICB	39		U		0.411		
2,2',3,3' - TeCB	40	40 + 41 + 71	C	0.939	0.196	0.85	1.334
2,2',3,4 - TeCB	41	40 + 41 + 71	C40				
2,2',3,4' - TeCB	42		K	0.587 <i>UR</i>	0.205	1.38	1.312
2,2',3,5 - TeCB	43		U		0.226		
2,2',3,5' - TeCB	44	44 + 47 + 65	CK	2.16 <i>UR</i>	0.179	0.95	1.285
2,2',3,6 - TeCB	45	45 + 51	CK	0.728 <i>UR</i>	0.195	0.64	1.147
2,2',3,8' - TeCB	46		U		0.230		
2,2',4,4' - TeCB	47	44 + 47 + 65	C44				
2,2',4,5 - TeCB	48			0.378	0.193	0.66	1.272
2,2',4,5' - TeCB	49	49 + 69	C	0.813	0.168	0.77	1.258
2,2',4,6 - TeCB	50	50 + 53	CK	0.301 <i>UR</i>	0.187	0.50	1.110
2,2',4,8' - TeCB	51	45 + 51	C45				
2,2',5,5' - TeCB	52			1.97	0.187	0.84	1.233
2,2',5,6' - TeCB	53	50 + 53	C50				
2,2',6,6' - TeCB	54		K	0.322 <i>UR</i>	0.155	0.57	1.000
2,3,3',4 - TeCB	55		U		0.617		
2,3,3',4' - TeCB	56		U		0.627		
2,3,3',5 - TeCB	57		U		0.602		
2,3,3',5' - TeCB	58		U		0.602		
2,3,3',6 - TeCB	59	59 + 62 + 75	C U		0.147		
2,3,4,4' - TeCB	60		U		0.625		
2,3,4,5 - TeCB	61	61 + 70 + 74 + 76	C	2.07	0.578	0.84	0.876
2,3,4,6 - TeCB	62	59 + 62 + 75	C59				
2,3,4',5 - TeCB	63		U		0.585		

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Approved by: *JK* QA/QC Chemist24-08-2003
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11/19/03

Lab Sample ID:

L5850-1

CLIENT ID:

AN-D14TB-030515

Sample Data Filename:

PB3C_357 S:5

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG [†]	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,4',6 - TeCB	64		K	0.453 <i>UR</i>	0.144	0.59	1.348
2,3,5,6 - TeCB	65	44 + 47 + 65	C44	0.872	0.590	0.88	0.884
2,3',4,4' - TeCB	66		U		0.535		
2,3',4,5 - TeCB	67		U		0.543		
2,3',4,5' - TeCB	68		U				
2,3',4,6 - TeCB	69	49 + 69	C49				
2,3',4',5 - TeCB	70	61 + 70 + 74 + 76	C61				
2,3',4',6 - TeCB	71	40 + 41 + 71	C40				
2,3',5,5' - TeCB	72		U		0.559		
2,3',5',6 - TeCB	73		U		0.147		
2,4,4',5 - TeCB	74	61 + 70 + 74 + 76	C61				
2,4,4',6 - TeCB	75	59 + 62 + 75	C59				
2',3,4,5 - TeCB	76	61 + 70 + 74 + 76	C61				
3,3',4,4' - TeCB	77		U		0.706		
3,3',4,5 - TeCB	78		U		0.645		
3,3',4,5' - TeCB	79		U		0.523		
3,3',5,5' - TeCB	80		U		0.598		
3,4,4',5 - TeCB	81		U		0.698		
2,2',3,3',4 - PeCB	82		U		0.250		
2,2',3,3',5 - PeCB	83	83 + 99	C	0.886	0.220	1.68	1.260
2,2',3,3',6 - PeCB	84			0.338	0.248	1.76	1.164
2,2',3,4,4' - PeCB	85	85 + 116 + 117	CK	0.389 <i>UR</i>	0.186	2.73	1.310
2,2',3,4,5 - PeCB	86	86 + 87 + 97 + 108 + 119 + 125	CK	1.30 <i>UR</i>	0.187	2.08	1.282
2,2',3,4,5' - PeCB	87	86 + 87 + 97 + 108 + 119 + 125	C86				
2,2',3,4,6 - PeCB	88	88 + 91	CK	0.390 <i>UR</i>	0.211	1.14	1.155
2,2',3,4,6' - PeCB	89		U		0.229		
2,2',3,4,5 - PeCB	90	90 + 101 + 113	CK	1.81 <i>UR</i>	0.191	1.92	1.238
2,2',3,4,6 - PeCB	91	88 + 91	C88				
2,2',3,5,5' - PeCB	92		U		0.220		
2,2',3,5,6 - PeCB	93	93 + 95 + 98 + 100 + 102	C	2.24	0.204	1.39	1.122
2,2',3,5,6' - PeCB	94		U		0.222		
2,2',3,5',6 - PeCB	95	93 + 95 + 98 + 100 + 102	C93				
2,2',3,6,6' - PeCB	96			0.074	0.0104	1.36	1.016
2,2',3,4,5 - PeCB	97	86 + 87 + 97 + 108 + 119 + 125	C86				
2,2',3,4,6 - PeCB	98	93 + 95 + 98 + 100 + 102	C93				
2,2',4,4',5 - PeCB	99	83 + 99	C83				
2,2',4,4',6 - PeCB	100	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,5' - PeCB	101	90 + 101 + 113	C90				
2,2',4,5,6' - PeCB	102	93 + 95 + 98 + 100 + 102	C93				
2,2',4,5,8 - PeCB	103		U		0.191		
2,2',4,6,6' - PeCB	104		K	0.193 <i>UR</i>	0.0123	1.19	1.001
2,3,3',4,4' - PeCB	105		K	0.595 <i>UR</i>	0.240	1.25	1.000
2,3,3',4,5 - PeCB	106		U		0.207		

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Lab Sample ID:

L5850-1

Sample Data Filename:

PB3C_357 S:5

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,3',4',5 - PeCB	107	107 + 124	C U		0.224		
2,3,3',4',5' - PeCB	108	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3,3',4,6 - PeCB	109			0.325	0.217	1.37	1.419
2,3,3',4',6 - PeCB	110	110 + 115	C	1.12	0.162	1.58	1.316
2,3,3',5,5' - PeCB	111		U		0.165		
2,3,3',5,6 - PeCB	112		U		0.162		
2,3,3',5',8 - PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5 - PeCB	114		K	0.342 <i>UR</i>	0.220	1.18	1.000
2,3,4,4',6 - PeCB	115	110 + 115	C110				
2,3,4,5,6 - PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6 - PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5 - PeCB	118			1.22	0.211	1.37	1.000
2,3',4,4',6 - PeCB	119	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3',4,5,5' - PeCB	120		U		0.162		
2,3',4,5',6 - PeCB	121		U		0.161		
2',3,3',4,5 - PeCB	122		U		0.238		
2',3,4,4',5 - PeCB	123		U		0.220		
2',3,4,5,5' - PeCB	124	107 + 124	C107				
2',3,4,5,8' - PeCB	125	86 + 87 + 97 + 108 + 119 + 125	C86				
3,3',4,4',5 - PeCB	126		U		0.273		
3,3',4,5,5' - PeCB	127		U		0.233		
2,2',3,3',4,4' - HxCB	128	128 + 166	C K	0.210 <i>UR</i>	0.179	1.80	0.959
2,2',3,3',4,5' - HxCB	129	129 + 138 + 180 + 163	C K	1.23 <i>UR</i>	0.173	1.53	0.929
2,2',3,3',4,5' - HxCB	130		U		0.223		
2,2',3,3',4,6 - HxCB	131		U		0.204		
2,2',3,3',4,6' - HxCB	132		K	0.447 <i>UR</i>	0.203	0.97	1.174
2,2',3,3',5,5' - HxCB	133		U		0.200		
2,2',3,3',5,8 - HxCB	134	134 + 143	C U		0.205		
2,2',3,3',5,8' - HxCB	135	135 + 151 + 154	C	0.708	0.0229	1.33	1.105
2,2',3,3',8,8' - HxCB	136			0.228	0.0172	1.41	1.024
2,2',3,4,4',5 - HxCB	137		U		0.199		
2,2',3,4,4',5' - HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6 - HxCB	139	139 + 140	C U		0.185		
2,2',3,4,4',6' - HxCB	140	139 + 140	C139				
2,2',3,4,5,5' - HxCB	141		K	0.250 <i>UR</i>	0.196	1.94	0.904
2,2',3,4,5,6 - HxCB	142		U		0.208		
2,2',3,4,5,8' - HxCB	143	134 + 143	C134				
2,2',3,4,5',6 - HxCB	144		K	0.194 <i>UR</i>	0.0241	0.47	1.121
2,2',3,4,6,8' - HxCB	145		K	0.105 <i>UR</i>	0.0175	0.82	1.034
2,2',3,4',5,5' - HxCB	146		K	0.183 <i>UR</i>	0.177	1.54	0.885
2,2',3,4',5,8 - HxCB	147	147 + 149	C	1.35	0.184	1.15	1.133
2,2',3,4',5,8' - HxCB	148		K	0.043 <i>UR</i>	0.0238	0.90	1.083
2,2',3,4',5,6 - HxCB	149	147 + 149	C147				

JRN
11/19/03

Form 1A

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Lab Sample ID:

L5850-1

Sample Data Filename:

PB3C_357 S:5

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,2',3,4',6,6' - HxCB	150		U		0.0168		
2,2',3,5,5',6 - HxCB	151	135 + 151 + 154	C135	0.062 <i>UR</i>	0.0164	4.64	1.008
2,2',3,5,6,6' - HxCB	152		K	1.39	0.155	1.27	0.899
2,2',4,4',5,5' - HxCB	153	153 + 168	C	0.178	0.0163	1.32	1.001
2,2',4,4',5,6' - HxCB	154	135 + 151 + 154	C135	0.587 <i>UR</i>	0.196	0.67	1.000
2,2',4,4',6,8' - HxCB	155		U	0.226 <i>UR</i>	0.140	0.80	0.938
2,3,3',4,4',5' - HxCB	156	156 + 157	CK	0.145			
2,3,3',4,4',5' - HxCB	157	156 + 157	C156	0.152			
2,3,3',4,4',6 - HxCB	158		K	0.154			
2,3,3',4,5,5' - HxCB	159		U				
2,3,3',4,5,6 - HxCB	160	129 + 138 + 160 + 163	C129	0.182	0.151	1.34	0.922
2,3,3',4,5,6 - HxCB	161		U	0.145			
2,3,3',4,5,5' - HxCB	162		U	0.152			
2,3,3',4',5,6 - HxCB	163	129 + 138 + 160 + 163	C129	0.156			
2,3,3',4',5,6 - HxCB	164		K	0.223 <i>UR</i>	0.138	0.65	1.000
2,3,3',5,5',6 - HxCB	165		U	0.689			
2,3,4,4',5,6 - HxCB	166	128 + 166	C128	0.547	0.0329	1.11	0.936
2,3',4,4',5,5' - HxCB	167		CK	0.453	0.0316	0.94	1.161
2,3',4,4',5,6 - HxCB	168	153 + 168	C153	0.0327			
3,3',4,4',5,5' - HxCB	169		U				
2,2',3,3',4,4',5 - HpCB	170		K	0.295	0.0290	0.95	1.132
2,2',3,3',4,4',6 - HpCB	171	171 + 173	C	0.158 <i>UR</i>	0.0285	3.70	1.102
2,2',3,3',4,5,5' - HpCB	172		U	0.076 <i>UR</i>	0.0216	0.70	1.033
2,2',3,3',4,5,6 - HpCB	173	171 + 173	C171	0.212	0.0322	1.18	1.145
2,2',3,3',4,5,6 - HpCB	174		K	0.068 <i>UR</i>	0.0292	6.44	1.084
2,2',3,3',4,5,6 - HpCB	175		K	0.234 <i>UR</i>	0.0202	1.46	1.011
2,2',3,3',4,6,6' - HpCB	176		CK	1.09 <i>UR</i>	0.0256	1.66	0.911
2,2',3,3',4',5,6 - HpCB	177		U	0.139	0.0283	0.98	1.115
2,2',3,3',5,5',6 - HpCB	178		K	0.273 <i>UR</i>	0.0283	0.46	1.126
2,2',3,3',5,6,6' - HpCB	179		K	0.073 <i>UR</i>	0.0194	2.12	1.025
2,2',3,4,4',5,5' - HpCB	180	180 + 193	C183	0.052 <i>UR</i>	0.0213	0.40	1.047
2,2',3,4,4',5,6 - HpCB	181		K	0.303	0.0261	1.06	1.108
2,2',3,4,4',5,6 - HpCB	182		K	0.156 <i>UR</i>	0.0200	0.31	1.000
2,2',3,4,4',5,6 - HpCB	183	183 + 185	K	0.292 <i>UR</i>	0.0134	1.21	1.000
2,2',3,4,4',6,6' - HpCB	184		K	0.080	0.0236	1.05	0.947
2,2',3,4,5,5',6 - HpCB	185	183 + 185	K	0.066 <i>UR</i>	0.0233	1.40	0.919
2,2',3,4,5,6,6' - HpCB	186		U	0.0255			
2,2',3,4',5,5',6 - HpCB	187						
2,2',3,4',5,6,6' - HpCB	188						
2,3,3',4,4',5,5' - HpCB	189						
2,3,3',4,4',5,6 - HpCB	190						
2,3,3',4,4',5,6 - HpCB	191						
2,3,3',4,5,5',6 - HpCB	192						

9139AD2_1.xls, S3

Approved by:  QA/QC Chemist24-08-2003
dd-mm-yyyy*R.W.
11/19/03*

Lab Sample ID:

L5850-1

CLIENT ID:

AN-D14TB-030515

Sample Data Filename:

PB3C_357 S:5

COMPOUND	IUPAC NO.	CO-ELUTIONS	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT	ION ABUND. RATIO	RRT
2,3,3',4',5,5',6 - HpCB	193	180 + 193	C180				
2,2',3,3',4,4',5,5' - OcCB	194		K	0.245 <i>UR</i>	0.0187	1.53	0.991
2,2',3,3',4,4',5,6 - OcCB	195		K	0.223 <i>UR</i>	0.0199	2.38	0.945
2,2',3,3',4,4',5,6' - OcCB	196		U		0.0291		
2,2',3,3',4,4',6,6' - OcCB	197	197 + 200	CK	0.152 <i>UR</i>	0.0203	0.10	1.045
2,2',3,3',4,5,5',6 - OcCB	198	198 + 199	CK	0.523 <i>UR</i>	0.0278	0.63	1.114
2,2',3,3',4,5,5',6' - OcCB	199	198 + 199	C198				
2,2',3,3',4,5,6,6' - OcCB	200	197 + 200	C197				
2,2',3,3',4,5',6,6' - OcCB	201		K	0.088 <i>UR</i>	0.0211	0.27	1.023
2,2',3,3',5,5',6,6' - OcCB	202		K	0.221 <i>UR</i>	0.0229	0.63	1.000
2,2',3,4,4',5,5',6 - OcCB	203		K	0.226 <i>UR</i>	0.0269	0.35	0.920
2,2',3,4,4',5,6,6' - OcCB	204		U		0.0205		
2,3,3',4,4',5,5',6 - OcCB	205		K	0.332 <i>UR</i>	0.0155	1.90	1.000
2,2',3,3',4,4',5,5',6 - NoCB	206		U		1.20		
2,2',3,3',4,4',5,6,6' - NoCB	207		U		0.918		
2,2',3,3',4,5,5',6,6' - NoCB	208		U		0.999		
2,2',3,3',4,4',5,5',6,6' - DeCB	209		K	0.942 <i>UR</i>	0.0257	1.42	1.001

(1) C = co-eluting congener; U = not detected; K = peak detected, but did not meet quantification criteria; E = exceeds calibrated linear range, see dilution data; D = dilution data; Z = compound not requested; X = results reported separately

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Approved by:  QA/QC Chemist24-08-2003
dd-mm-yyyy7/2003
11/19/03

Form 2
PCB CONGENER ANALYSIS REPORTCLIENT ID:
AN-D14TB-030515

Lab Name: AXYS ANALYTICAL SERVICES		Sample Collection:	N/A
Contract No.:	9952	Lab Sample ID:	L5850-1
Matrix:	AQUEOUS	Sample Size:	0.931 L
Sample Receipt Date:	16-May-2003	Initial Calibration Date:	19-Jun-2003
Extraction Date:	30-Jun-2003	Instrument ID:	HR GC/MS
Analysis Date:	07-Jul-2003	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Sample Datafile:	PB3C_357 S:5
Injection Volume (µL):	1.0	Blank Data Filename:	PB3C_357 S:4
Dilution Factor:	N/A	Cal. Ver. Data Filename:	PB3C_357 S:1
Concentration Units :	pg absolute		

LABELED COMPOUND	IUPAC NO. ¹	CO-ELUTIONS	LAB FLAG ²	SPIKE CONC.	CONC. FOUND	R(%) ³	ION ABUND. RATIO	RRT
13C12-2 - MoCB	1L			2000	1050	52.7	3.25	0.719
13C12-4 - MoCB	3L			2000	971	48.5	3.03	0.858
13C12-2,2' - DICB	4L			2000	907	45.3	1.56	0.873
13C12-4,4' - DICB	15L			2000	873	43.6	1.55	1.252
13C12-2,2',6 - TrICB	19L			2000	880	44.0	1.06	1.071
13C12-3,4,4' - TrICB	37L			2000	1120	55.9	1.03	1.092
13C12-2,2',6,6' - TeCB	54L			2000	870	43.5	0.82	0.812
13C12-3,3',4,4' - TeCB	77L			2000	1190	59.3	0.76	1.395
13C12-3,4,4',5 - TeCB	81L			2000	1170	58.4	0.75	1.372
13C12-2,2',4,6,6' - PeCB	104L			2000	858	42.9	1.57	0.808
13C12-2,3,3',4,4' - PeCB	105L			2000	1310	65.5	1.59	1.199
13C12-2,3,4,4',5 - PeCB	114L			2000	1320	66.2	1.59	1.178
13C12-2,3',4,4',5 - PeCB	118L			2000	1390	69.4	1.56	1.161
13C12-2',3,4,4',5 - PeCB	123L			2000	1370	68.7	1.58	1.150
13C12-3,3',4,4',5 - PeCB	126L			2000	1330	68.7	1.58	1.300
13C12-2,2',4,4',6,6' - HxCB	155L			2000	1110	55.4	1.27	0.787
13C12-2,3,3',4,4',5 - HxCB	156L	156L + 157L	C	4000	2490	62.3	1.33	1.107
13C12-2,3,3',4,4',5' - HxCB	157L	156L + 157L	C156L					
13C12-2,3',4,4',5,5' - HxCB	167L			2000	1360	68.0	1.31	1.077
13C12-3,3',4,4',5,5' - HxCB	169L			2000	1200	59.8	1.32	1.190
13C12-2,2',3,3',4,4',5 - HpCB	170L			2000	1270	63.7	1.09	0.897
13C12-2,2',3,4,4',5,5' - HpCB	180L			2000	1370	68.4	1.06	0.873
13C12-2,2',3,4',5,6,6' - HpCB	188L			2000	1280	64.2	1.08	0.713
13C12-2,3,3',4,4',5,5' - HpCB	189L			2000	1450	72.7	1.06	0.959
13C12-2,2',3,3',5,5',6,6' - OcCB	202L			2000	1300	65.1	0.93	0.818
13C12-2,3,3',4,4',5,5',6 - OcCB	205L			2000	1370	68.7	0.92	1.009
13C12-2,2',3,3',4,4',5,5',6 - NoCB	208L			2000	1290	64.7	0.80	1.043
13C12-2,2',3,3',4,5,5',6,6' - NoCB	208L			2000	1350	67.3	0.83	0.950
13C12-2,2',3,3',4,4',5,5',6,6' - DeCB	209L			2000	1400	70.0	1.20	1.075

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Approved by:

QA/QC Chemist

24-08-2003
dd-mm-yyyy

Form 2 (Continued)
PCB CONGENER ANALYSIS REPORT

CLIENT ID:
AN-D14TB-030515

Lab Name:	AXYS ANALYTICAL SERVICES	Sample Collection:	N/A
Contract No.:	9952	Lab Sample ID:	L5850-1
Matrix:	AQUEOUS	Sample Size:	0.931 L
Sample Receipt Date:	16-May-2003	Initial Calibration Date:	19-Jun-2003
Extraction Date:	30-Jun-2003	Instrument ID:	HR GC/MS
Analysis Date:	07-Jul-2003	GC Column ID:	SPB-OCTYL
Extract Volume (µL):	22	Sample Datafile:	PB3C_357 S:5
Injection Volume (µL):	1.0	Blank Data Filename:	PB3C_357 S:4
Dilution Factor:	N/A	Cal. Ver. Data Filename:	PB3C_357 S:1
Concentration Units :	pg absolute		

CLEAN-UP STANDARD	IUPAC NO. ¹	LAB FLAG ²	SPIKE CONC.	CONC. FOUND	R(%) ³	ION ABUND. RATIO	RRT
13C12- 2,4,4' - TrICB	28L		2000	1180	57.9	1.03	0.925
13C12-2,3,3',5,5' - PeCB	111L		2000	1460	72.9	1.62	1.087
13C12-2,2',3,3',5,5',6 - HpCB	178L		2000	1490	74.4	1.08	1.012

(1) Suffix "L" indicates labeled compound

(2) C = co-eluting congener; E = exceeds calibrated linear range, see dilution data; D = dilution data; Z = compound not requested; X = results reported separately
(3) R% = percent recovery of labeled compounds

Form 1A
HOMOLOGUE TOTAL POLYCHLORINATED BIPHENYLS (PCB) ANALYSIS REPORT

Sample Collection: N/A

Lab Name: AXYS ANALYTICAL SERVICES

Contract No.:	9952	Lab Sample ID:	L5850-1		
Matrix:	AQUEOUS	Sample Size:	0.931 L		
Sample Receipt Date:	16-May-2003	Initial Calibration Date:	19-Jun-2003		
Extraction Date:	30-Jun-2003	Instrument ID:	HR GC/MS		
Analysis Date:	07-Jul-2003	Time:	1:09:55	GC Column ID:	SPB-OCTYL
Extract Volume (μ L):	22	Blank Data Filename:	PB3C_357 S:4		
Injection Volume (μ L):	1.0	Cal. Ver. Data Filename:	PB3C_357 S:1		
Dilution Factor:	N/A	Sample Datafile(s):	PB3C_357 S:5		
Concentration Units :	pg/L				

PCB HOMOLOGUE GROUP	LAB FLAG ¹	CONC. FOUND	DETECTION LIMIT
Total Monochloro Biphenyls		1.76	0.324
Total Dichloro Biphenyls	U		1.28
Total Trichloro Biphenyls		5.89	0.595
Total Tetrachloro Biphenyls		7.04	0.706
Total Pentachloro Biphenyls		6.21	0.273
Total Hexachloro Biphenyls		4.04	0.689
Total Heptachloro Biphenyls		2.03	0.0329
Total Octachloro Biphenyls	U		0.0291
Total Nonachloro Biphenyls	U		1.20
Decachloro Biphenyl	U		0.0257
TOTAL PCBs		27.0	

(1) U = Not detected

(2) All header information pertains to the initial instrumental analysis of the sample extract.
Additional sample datafiles listed refer to secondary analysis of the sample extract.